

CLAIMS

1. A thrust reverser comprising:  
a fan nacelle having radially outer and inner skins extending axially from a leading edge defining an inlet to a trailing edge defining an outlet, and spaced apart radially to define a compartment spaced forwardly from said outlet;  
a forward louver pivotally mounted in said compartment;  
an aft louver pivotally mounted in said compartment behind said forward louver;  
an aft flap integrally joined to said aft louver for rotation therewith;  
a unison link pivotally joining together said forward and aft louvers; and  
an actuator joined to said louvers for rotation thereof between a stowed position contained in said compartment to a deployed position at which said louvers are pivoted open outwardly from said outer skin, and said aft flap is pivoted open inwardly from said inner skin.
2. A reverser according to claim 1 wherein:  
said aft louver and aft flap are coextensive, and disposed flush with said inner skin in said stowed position; and  
said forward louver is disposed flush with said outer skin in said stowed position.
3. A reverser according to claim 2 wherein:  
said forward louver extends forward of said aft louver in said stowed position; and  
further including an aft fairing integrally joined to said aft louver, and spaced in part thereabove flush with said forward louver and outer skin in said stowed position.
4. A reverser according to claim 3 further comprising:  
a forward flap pivotally mounted in said compartment below said forward louver, and disposed flush with said inner skin and aft flap in said stowed position.
5. A reverser according to claim 4 wherein said forward flap is pivotally joined to said forward louver for synchronization therewith.

6. A reverser according to claim 5 wherein:  
said forward louver is pivotally joined near an aft end thereof in said compartment;  
said forward flap is pivotally joined near an aft end thereof in said compartment; and  
both said aft louver and aft flap are pivotally joined in common in said compartment  
near an aft end of said aft louver and near a forward end of said aft flap.
7. A reverser according to claim 6 further comprising:  
an idler link pivotally joining together said forward louver and forward flap; and  
a drive link pivotally joining said actuator to said forward louver for movement  
between said stowed and deployed positions.
8. A reverser according to claim 7 further comprising:  
a pair of laterally spaced apart cantilevers extending aft in said compartment;  
said forward louver and forward flap being pivotally joined to both said cantilevers;  
and  
a pair of said unison links pivotally joining together said forward and aft louvers at  
laterally opposite sides thereof.
9. A reverser according to claim 8 wherein said drive link is pivotally joined to the lateral  
middle of said forward louver.
10. A reverser according to claim 9 wherein said idler link is pivotally joined to the lateral  
middle of said forward flap.
11. A reverser according to claim 10 wherein said forward flap is shorter than said aft flap.
12. A reverser according to claim 11 wherein forward louver is joined to said cantilevers  
to forwardly deploy outward, and said forward flap is joined to said cantilevers to forwardly  
deploy inward in counter-position with said forward louver for reverse turning exhaust flow

through said nacelle.

13. A reverser according to claim 12 wherein said aft louver and aft flap are pivotally joined in said compartment to parallel said forward louver in said deployed position.

14. A reverser according to claim 13 further comprising:

a core engine having an external core cowl mounted inside said nacelle to define an annular bypass duct therebetween terminating in a fan nozzle at said nacelle trailing edge; and  
said aft flap is sized to reach said core cowl when deployed, and block flow discharge through said fan nozzle for reversing thrust along said deployed louvers.

15. A fan thrust reverser comprising:

a fan nacelle having outer and inner skins extending between leading and trailing edges, and an arcuate compartment between said skins having a flow tunnel extending radially therebetween;

a forward louver and aft fairing pivotally mounted in said compartment to close said tunnel along said outer skin in a stowed position;

a forward flap and an aft flap pivotally mounted in said compartment along said inner skin;

an aft louver aligned between said forward and aft flaps in said stowed position to close said tunnel along said inner skin, and integrally joined to said aft fairing and aft flap for movement therewith; and

means for deploying open in unison said forward and aft louvers and said forward and aft flaps.

16. A reverser according to claim 15 wherein:

said forward louver is pivotally joined near an aft end thereof in said compartment;  
said forward flap is pivotally joined near an aft end thereof in said compartment; and  
both said aft louver and aft flap are pivotally joined in common in said compartment near an aft end of said aft louver and near a forward end of said aft flap.

17. A reverser according to claim 16 wherein:

said aft louver and aft flap are coextensive, and disposed flush with said inner skin in said stowed position; and

said forward louver is disposed flush with said outer skin in said stowed position.

18. A reverser according to claim 17 wherein said deploying means comprise:

a unison link pivotally joining together said forward and aft louvers;

an idler link pivotally joining together said forward louver and forward flap; and

an actuator joined to said forward louver for rotation thereof between said stowed position and a deployed position, with said unison and idler links synchronizing rotation of said aft louver and aft flap with said forward louver and forward flap.

19. A reverser according to claim 18 wherein forward louver is joined in said compartment to forwardly deploy outward, and said forward flap is joined in said compartment to forwardly deploy inward in counter-position with said forward louver for reverse turning exhaust flow through said nacelle.

20. A reverser according to claim 19 wherein said aft louver and aft flap are pivotally joined in said compartment to parallel said forward louver in said deployed position.

21. A reverser according to claim 20 further comprising:

a pair of laterally spaced apart cantilevers extending aft in said compartment;

said forward louver and forward flap being pivotally joined to both said cantilevers; and

a pair of said unison links pivotally joining together said forward and aft louvers at laterally opposite sides thereof.

22. A reverser according to claim 21 wherein said drive link is pivotally joined to the lateral middle of said forward louver.

23. A reverser according to claim 22 wherein said idler link is pivotally joined to the lateral middle of said forward flap.
24. A reverser according to claim 21 wherein said forward flap is shorter than said aft flap.
25. A reverser according to claim 21 further comprising:  
a core engine having an external core cowl mounted inside said nacelle to define an annular bypass duct therebetween terminating in a fan nozzle at said nacelle trailing edge; and  
said aft flap is sized to reach said core cowl when deployed, and block flow discharge through said fan nozzle for reversing thrust along said deployed louvers.